

AMENDMENTS TO THE CLAIMS

Please amend claims 1, 13, 25, 26 and 33 as follows.

1. (Currently Amended) A tunable filter for use in optical communication apparatus, said tunable filter being tunable to each selected center wavelength of a number of channels, and each of the channels centered on a corresponding gridline of a selected wavelength grid; said tunable filter comprising:

a grid generator having reflective surfaces, mounted for optical alignment in an optical path of a beam, and the grid generator of a first selected optical path length determinative of a first free spectral range ~~corresponding to a spacing between adjacent~~ having a first plurality of transmission peaks corresponding to gridlines of the selected wavelength grid;

a channel selector having reflected surfaces, mounted for optical alignment in the optical path of the beam, and the channel selector with a tunable second optical path length determinative of a second free spectral range having a second plurality of transmission peaks within the selected wavelength grid, ~~a difference between the first free spectral range and the second free spectral range being inversely proportional to the number of channels of the selected wavelength grid and said second optical path length tunable to a selected one of the number of channels of the wavelength grid~~, wherein the second free spectral range (FSR2) is related to the first free spectral range (FSR1) by the equation:

$$\text{FSR2} \approx (M / M \pm 1)(\text{FSR1})$$

wherein M is the total number of channels within the selected wavelength grid;

means for maintaining the first optical path length of the grid generator; and

means for varying the tunable second optical path length of the channel selector to tune the optical beam to a selected channel of the wavelength grid and substantially attenuate the other channels of the wavelength grid.

2. (Original) The tunable filter of Claim 1, wherein the second free spectral range of said channel selector differs from the first free spectral range by an amount substantially corresponding with the quotient of the first free spectral range and the number of channels of the selected wavelength grid.

3. (Original) The tunable filter of Claim 1, wherein a finesse of said channel selector substantially corresponds with less than the number of channels of the selected wavelength grid.

4. (Original) The tunable filter of Claim 1, wherein said grid generator further comprises at least one of a Fabry-Perot filter and an interference element.

5. (Original) The tunable filter of Claim 1, wherein said grid generator further comprises an etalon.

6. (Currently Amended) The tunable filter of Claim 1, wherein said grid generator further comprises an Etalon; and wherein said means for maintaining the first optical path length of the grid generator comprises a thermal controller to control a temperature of said Etalon.

7. (Original) The tunable filter of Claim 1, wherein said channel selector further comprises at least one of: a diffraction element, an interference element, and a birefringent element.

8. (Previously presented) The tunable filter of Claim 1, wherein said means for varying the tunable second optical path length of the channel selector comprises a mechanical actuator to tune said channel selector by varying the tunable second optical path length of said channel selector.

9. (Previously presented) The tunable filter of Claim 1, wherein said means for varying the tunable second optical path length of the channel selector comprises a thermal actuator to tune said channel selector by varying a temperature of the channel selector.

10. (Previously presented) The tunable filter of Claim 1, wherein said means for varying the tunable second optical path length of the channel selector comprises an electro-optic actuator to tune said channel selector by varying the tunable second optical path length of said channel selector.

11. (Original) The tunable filter of Claim 1, wherein the channel selector includes at least one of selected length and a tunable index of refraction.

12. (Original) The tunable filter of Claim 1, wherein the channel selector includes a tunable length and a selected index of refraction.

13. (Currently amended) The tunable filter of Claim 1, wherein said channel selector comprises:

[[an]] a gas spaced etalon tunable by means of tuning a pressure of a gas within the gap to vary the second optical path length.

14. (Previously presented) The tunable filter of Claim 1, wherein said channel selector comprises:

an etalon electrically tunable in response to an applied electric field to vary the second optical path length.

15. (Original) The tunable filter of Claim 1, wherein the channel selector further comprises:

an etalon thermally tunable in response to an applied thermal energy to vary the second optical path length.

16. (Previously presented) The tunable filter of Claim 1, wherein said channel selector further comprises:

a semiconductor element with a tunable index of refraction responsive to an applied electric field to vary the second optical path length.

17. (Original) The tunable filter of Claim 7, wherein the birefringent element includes at least one of: a Pockels cell and a Kerr cell.

18. (Original) The tunable filter of Claim 7, wherein the interference element comprises:

a wedge-shaped etalon.

19. (Original) The tunable filter of Claim 18, wherein the interference element comprises at least one of a wedge-shaped solid etalon and a wedge-shaped air gap etalon.

20. (Previously presented) The tunable filter of Claim 18, wherein said means for varying the tunable second optical path length comprises an actuator for translating said wedge-shaped etalon across the optical path of the beam to tune the second optical path length.

21. (Previously presented) The tunable filter of Claim 1, wherein said channel selector further comprises a grating; and wherein said means for varying the tunable second optical path length of the channel selector comprises an actuator for varying an angle of said grating with respect to an optical path of the beam to tune the beam to a selected one of the plurality of channels of the wavelength grid.

22. (Original) The tunable filter of Claim 1, further comprising:

a logic to tune said channel selector to the selected one of the number of channels of the wavelength grid.

23. (Original) The tunable filter of Claim 1, further comprising:
a logic to tune said grid generator to the selected wavelength grid.

24. (Original) In the communication apparatus of Claim 1, a further improvement of:

a gain medium to emit a beam, and said gain medium capable of accepting feedback to tune the gain medium to a selected one of the number of channels of the wavelength grid.

25. (Currently amended) The communication apparatus of claim 1, ~~[[a]]~~ further improvement comprising:

a first optical circulator with at least a first port, a second port and a third port and a beam entering the first port exiting the second port, and the beam entering the second port exiting the third port;

a second optical circulator with at least the first port, the second port and the third port and the beam entering the first port exiting the second port, and the beam entering the second port exiting the third port; and

said tunable filter optically coupled to the second port of said first optical circulator and the first port of said second optical circulator to tune a selected one of the number of channels of the wavelength grid to pass between the second port of said first optical circulator and the first port of said second optical circulator.

26. (Currently amended) The communication apparatus of Claim 1, ~~[[a]]~~ further improvement comprising:

a gain medium tunable to emit a beam at a selected wavelength;

said tunable filter with an input an output, and said tunable filter input positioned in an optical path of the beam to provide at said output a filter of said beam at a selected one of the number of channels of wavelength grid;

an error detector to detect a difference in energy levels of said beam at said input and said output of said tunable filter; and

logic for providing a closed loop feedback of the difference to tune said gain medium to the selected one of the number of channels.

27. (Previously presented) The communication apparatus of Claim 1, and said grid generator comprising:

a gain medium to emit a beam, and the gain medium including a front facet and a rear facet and the first selected optical path length between the front facet and the rear facet determinative of the first free spectral range and corresponding to the spacing between adjacent gridlines of the selected wavelength grid.

28. (Previously presented) The communication apparatus of Claim 1, and said channel selector comprising:

a gain medium to emit a beam and the gain medium including a front facet and a rear facet and the tunable second selected optical path length between the front facet and the rear facet determinative of the second free spectral range, a difference between the first free spectral range and the second free spectral range being inversely proportional to the number of channels of the selected wavelength grid, and said second optical path length tunable to a selected one of the number of channels of the wavelength grid.

Claims 29-32 (Cancelled)

33. (Currently amended) A method for filtering an optical beam to a corresponding center wavelength for each of a number of channels of a selected wavelength grid, comprising the steps of:

generating a first set of wavelengths corresponding to a first plurality of transmission peaks within the optical beam having a first free spectral range corresponding to the center wavelengths of each of the channels of the selected wavelength grid;

generating a variable second set of wavelengths corresponding to a second plurality of transmission peaks within the optical beam having a second free spectral range, ~~such that a difference between the second free range and the first free spectral range is inversely proportional to the number of channels of the selected wavelength grid, wherein the~~

second free spectral range (FSR2) is related to the first free spectral range (FSR1) by the equation:

$$\text{FSR2} \approx (M / M \pm 1)(\text{FSR1})$$

wherein M is the total number of channels within the selected wavelength grid;

and

varying the second set of wavelengths such that the optical beam is substantially attenuated at all center wavelengths of each of the channels of the selected wavelength grid except a desired channel.

34. (Previously presented) The method of Claim 33, wherein the step of generating the first set of wavelengths comprises aligning a grid generator having an optical path length determinative of the first free spectral range with the optical beam.

35. (Previously presented) The method of Claim 33, wherein the step of generating the variable second set of wavelengths comprises the step of aligning a channel selector having a variable optical path length determinative of the second free spectral range with the optical beam.

36. (Previously presented) The method of Claim 33, wherein the step of varying the variable second set of wavelengths comprises the step of varying the optical path length of the channel selector.